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Micromite™ II Service Manual

THERMO ELECTRIC

PART #E2295
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how to use this manual

This manual should be used in conjunction with the Instruction Manual furnished with the Micromite II. The **Instruction Manual** contains all the information you will need to *operate* the Micromite II and this **Service Manual** contains the information you will need to *recalibrate* the instrument.

In addition to the recalibration procedure, complete schematic drawings and parts lists, we have included some information from the Instruction Manual to familiarize you with the Micromite II.

You will find general information on Micromite II, the Portable Temperature Laboratory, optional accessories, the Micromite II product code, maintenance, service and warranty information and complete Micromite II specifications in this manual.

We recommend you read through this information carefully. If you have a problem, you may find that referring to the troubleshooting guide will help you solve the problem, without requiring any further procedures.

Should you want to recalibrate the Micromite II to insure it remains within spec, please see that only qualified technicians with the proper equipment attempt this recalibration, or any other service procedures on the Micromite II. As you will see, calibrating the instrument does not require opening

the case and, unless the instrument is abused or damaged during the calibration process, it should not affect the warranty.

However, attempting to service the Micromite II in any other way may void its warranty. We recommend you return the Micromite II to Thermo Electric for service. Please refer to the "section 4, instrument service" for details.

section 1 maintenance

1-1 general maintenance

Under the terms of the warranty (discussed fully in Section 3 of this manual), Thermo Electric warrants the Micromite II to be free from all defects in material and workmanship for a period of two years... and Thermo Electric's liability is limited to the repair or replacement of the product only if failure occurs during the warranty period ***and factory inspection shows no external effects or customer repair altered the functioning of the instrument.***

As the Micromite II is a complex and sophisticated electronic instrument and you risk voiding your warranty under the terms described above, any repair or replacement of parts should be attempted only by technically qualified individuals.

While recalibration of the Micromite II *can* be done in the field if you have the appropriate equipment (See section 2-2, page 13), and qualified personnel, we strongly recommend you return the Micromite II to Thermo Electric for any other service that may be required.

1-2 troubleshooting guide

The following is a basic troubleshooting guide which can be used to help identify and correct problems that may occur with the Micromite II.

If you are unable to perform these checks or they do not correct the problem, you can call a Thermo

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Electric Instrument Service Representative at the factory, (201) 843-5800, who may be able to help you resolve the problem over the phone.

If the problem still cannot be resolved, the Micromite II should be returned to the factory or to a Thermo Electric Instrument Service Center for repair. If this is necessary, please follow these instructions:

1 Pack the Micromite II carefully, to prevent shipping damage.

2 Include a brief note with a description of the problem and your company's name, address, phone number, your name and any other identifying data required to contact you and return the instrument.

3 If you don't know the location of your nearest Instrument Service Center, call your Thermo Electric representative or your nearest Thermo Electric Regional Office. A list of these Regional Offices is included in Section 4 of this manual.

4 Send the Micromite II, prepaid, to the nearest Thermo Electric Service Center or to the factory:

Thermo Electric Co.
109 North 5th Street
Saddle Brook, NJ 07662
Attn: Instrument Service Department

5 If you're sending the Micromite II to the factory, please call first to obtain a Material Return Authorization (MRA) number. Be sure to place that number on the outside of the carton in which you ship the instrument.

Symptom	Possible Cause	Corrective Action
No display (Micromite II will not turn on	Dead batteries.	Replace batteries or use AC adapter.

Symptom	Possible Cause	Corrective Action
	Batteries not inserted properly or dirty battery terminals.	Check polarity of batteries and clean terminals.
	AC adapter not plugged into instrument or wall properly.	Check connections. Try another outlet.
Display indicates: **Reset! Please turn off**	Instrument turned off by removing power (e.g. unplugging adapter while instrument is on, power failure or removing batteries while instrument is on).	Turn instrument off and on again. Sensor will default to Type J. See Section 2-3, page 11 of the Instruction Manual.
	Input wires and/or instrument may be too close to an EMI/RFI source (e.g. a large inductor or RF transmitter).	Place input wires and/ instrument some distance from interference source to prevent noise pick-up. Turn instrument off and on again. Sensor will default to Type J.
	If using adapter, may be using wrong adapter or line voltage may be too low or occasionally dipping.	Make sure AC adapter is specified for your line voltage. Try using line conditioner or operate instrument on batteries.
		If, after checking the above, this display continues, return for service.
Display indicates: **Sensor is open!**	Possible open input circuit or broken thermocouple lead.	Check sensor and terminal wires.

Symptom	Possible Cause	Corrective Action
	"+" and/or "-" knobs may not be fully tightened.	Tighten knobs. Do not overtighten.
	If sensor type is RTD or Ω, leads may be broken or connected incorrectly.	Check RTD leads. If they are functional, refer to to Section 2-6, page 16 of the Instruction Manual.
Input indication is incorrect	Thermocouple, RTD or or copper wires may be connected backwards or incorrectly.	Refer to Section 2-6, page 16 of the Instruction Manual.
	Instrument may be in output mode instead of input mode.	Return instrument to input mode. Refer to Section 2-7, page 24 of the Instruction Manual.
	Instrument is set for wrong sensor type.	Refer to Section 2-5, page 12 of the Instruction Manual.
	Thermocouple is defective.	Verify correct instrument operation by placing it in any thermocouple range, except Type B. Short the input. If the instrument is working properly, it should indicate room temperature.
	RTD is defective.	Verify correct instrument operation by trying another known working RTD or resistance.
	Poor thermocouple or RTD placement.	Verify thermocouple or RTD placement at measuring point.

Symptom	Possible Cause	Corrective Action
Incorrect output	Thermocouple or copper lead wires my be connected backwards or incorrectly.	Refer to Section 2-7, pg. 18, Instruction Manual. If RTD or Ω output does not work, refer to Section 2-7, RTD output, page 19 of the Instruction Manual. RTD/Ω output is wired differently than RTD/Ω input.
	Instrument is set for wrong sensor type.	Refer to Section 2-5,. page 12 of the Instruction Manual.
	Instrument is in input instead of output mode.	Enter output mode.Refer to Section 2-7, page 18 of the Instruction Manual.
	Possible broken leads or connecting wire.	Check leads or use known working leads.
	"+" and/or "-" knobs may not be fully tightened.	Tighten knobs. Do not overtighten.
Input indication jumps when in input mode or output signal jumps when in output mode	Input/output wires and/or instrument may be placed too close to EMI/RFI source (e.g. a large inductor or large RF transmitter).	Place input/output wires and/or instrument some distance from interference source to prevent noise pick-up. Shield input/output wires.
	If in output mode, output may not yet be settled.	Allow time for settling. Refer to specs in Section 5.
	"+" and/or "-" knobs may not be fully tightened.	Tighten knobs. Do not overtighten.

Symptom	Possible Cause	Corrective Action
	If using adapter, may be using wrong adapter or line voltage may be too low or occasionally dipping.	Make sure AC adapter is specified for your line voltage. Try using line conditioner or operate instrument on batteries. If problem persists, return instrument for service.

section 2 recalibration procedure

2-1 introduction

The Micromite II has several precision internal references. When the instrument is calibrated, these internal references are accurately measured by one of the Micromite II's microprocessors. The values of these references are then permanently stored in the unit's memory.

During normal use, the Micromite II automatically recalibrates its own circuitry against these "known" references approximately every 15 seconds. This unique method of calibration gives the Micromite II its high accuracy, stability and repeatability.

Since the Mircomite II is calibrated at the factory before shipment, it will give you precise, accurate results immediately. However, over time, the value of the internal references may change slightly as a natural result of aging. As this process varies from instrument to instrument, we recommend that your Micromite II be tested and, if necessary, be re-calibrated every six months to insure that it meets its specified accuracy.

The Micromite II should be tested and/or recalibrated only by qualified personnel with the appropriate equipment as specified below.

2-2 equipment required for recalibration

- Adjustable mV standard, 0 to 99.000 mV, 0.0001 mV resolution, with an accuracy of ± 0.0005 mV

- Low EMF and low resistance shorting terminal (gold or copper) or 0.0000 mV standard, with an accuracy of ± 0.0005 mV

- 400.000 Ω resistance standard, with an accuracy of ± 0.005 Ω

- Stirred ice bath (32.0°F), with an accuracy of ± 0.05°F

- ISA J precision reference thermocouple with a known error at a temperature differential between room temperature and ice (32.0°F), with an accuracy of ± 0.05°F (± 0.001 mV)

- Adjustable power supply (5.0 - 9.0 volts @ 100 mA), with an accuracy of ± 0.05 V

2-3 entering the calibration mode

To enter the calibration mode, press the # 3 key and the "Enter" key simultaneously. The instrument will display the following menu of calibration modes:

Calibration: Batt
mV RTD RJC Exit

The cursor can be moved to the right by pressing the (up key) or to the left by pressing the (down key).

2-4 exiting the calibration mode

The calibration mode can be exited at any time by moving the cursor to **Exit** on the display and pressing the "Enter" key. There will be a few seconds delay after the "Enter" key is pressed until the Micromite II returns to its normal operating mode.

2-5 important procedural information

- All calibrations should be performed *in the case*. There are no potentiometers in the instrument and calibration errors can result if the Micromite II is out of its case.

- The Micromite II should be turned on for at least *30 minutes* before any calibration is performed. If the instrument has been subject to a recent large change in ambient temperature (e.g. if it were stored in your car trunk on a hot or cold day and then brought into a building), it should be turned on for at least *1 hour* before any calibration is performed.

- If, during the calibration, the Micromite II displays:

  Reset!
  Please Turn Off

  This is a warning message informing you that an improper procedure has been preformed.

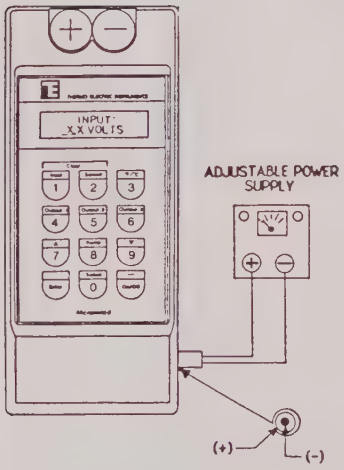
  Recheck all connections, inputs and procedures. Turn the instrument off and on again. Repeat the procedure. If the instrument still displays the same message, it needs repair.

- Each of the items in the calibration menu can be performed independently of the others. Any number of calibration items can be performed in one calibration session. However, the RJC calibration should be done only if you are certain that the mV portion of the Micromite II is in calibration. Otherwise, *serious RJC calibration errors can occur.*

- All calibrations, except for the battery trip point calibration, should be performed while the instrument is powered only by the internal batteries or the supplied AC adapter. Any other power source (e.g. an adjustable power supply) could cause calibration errors.

- Never remove the power while in the calibration mode. The calibration constants that are calculated during each calibration are only stored upon exiting the calibration mode. Removing power before exiting the calibration mode will result in the loss of all newly calculated constants.

2-6 battery trip point calibration



BATTERY CALIBRATION
Figure 2.1

Equipment needed: adjustable power supply Note; all voltage inputs should be through the ac adapter

Connect the power supply to the instrument through the ac adapter jack as shown in Figure 2.1. Adjust the supply to 9 volts. Enter the calibration mode, as described above. Move the cursor to **Batt** and press "Enter." The display will indicate:

Input: **6.20 Volts**

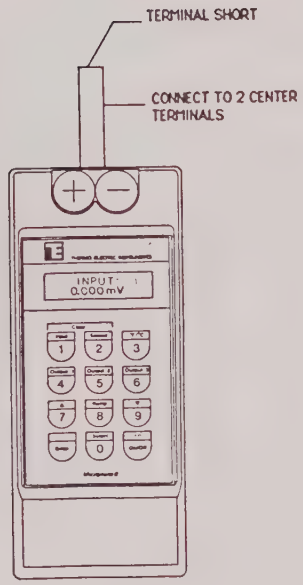
Adjust the power supply to 6.2 volts (±0.05 volts) and press "Enter". The display will indicate **WAIT!** for 15 seconds while it is calibrating. When this step is completed, the Micromite II will display:

Input: **5.70 Volts**

Adjust the power supply to 5.7 volts (±0.05 volts) and press "Enter". The display will indicate **WAIT!** for 15

seconds while it is calibrating. When the instrument is done calibrating, it will display the calibration menu with the cursor pointing to **mV**. We suggest you **EXIT** the calibration mode. Then turn the Micromite off and restore power with the internal batteries or the AC adapter supplied.

While it is possible to do the other calibrations with the adjustable power supply connected to the instrument, we recommend you use the batteries or the AC adapter.



0.000 mV CALIBRATION
Figure 2.2

2-7 millivolt calibration

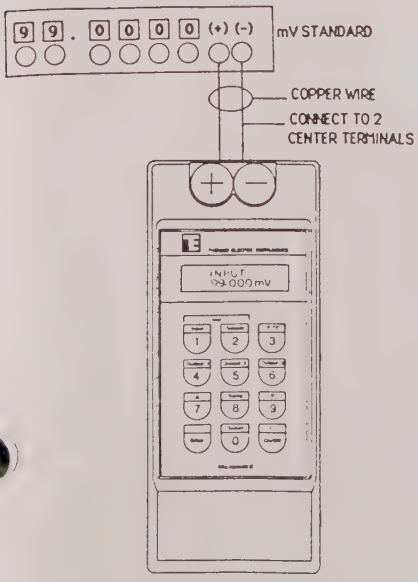
Equipment needed: mV standard, terminal short

Enter the calibration mode, move the cursor to **mV** and press "Enter". The display will indicate:

Input:
0.000 mV

Connect the input as shown in Figure 2.2, using the terminal short. Press "Enter". The Micromite II will indicate **WAIT!** for 15 seconds while it is calibrating. When the calibration is complete, the instrument will display:

Input:
99.000 mV



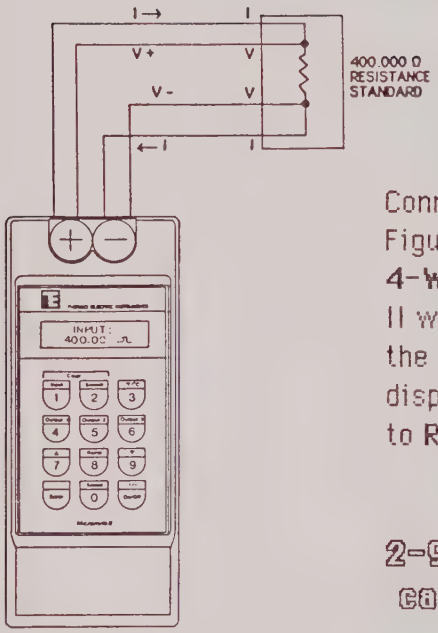
99.000 mV CALIBRATION
Figure 2.3

Connect the mV standard input as shown in Figure 2.3. We recommend you make these connections using low emf connectors (gold /copper). Input 99.000 mV (±0.0005 mV). Press "Enter". The Micromite II will indicate **WAIT!** for 15 seconds while it is calibrating. When the calibration is complete, the instrument will display the calibration menu with the cursor pointing to **RTD**.

2-8 RTD calibration

Equipment needed: 400.00Ω standard

Enter the calibration mode, move the cursor to **RTD** and press "Enter". The display will indicate:



RTD CALIBRATION
Figure 2.4

Input: **400.00Ω**

Connect the 400.00Ω (±0.005Ω) standard as shown in Figure 2.4. This connection must be made in the **4-Wire** configuration. Press "Enter". The Micromite II will display **WAIT!** for approx. 20 seconds. When the calibration is completed, the instrument will display the calibration menu with the cursor pointing to **RJC**.

2-9 Reference Junction compensation calibration

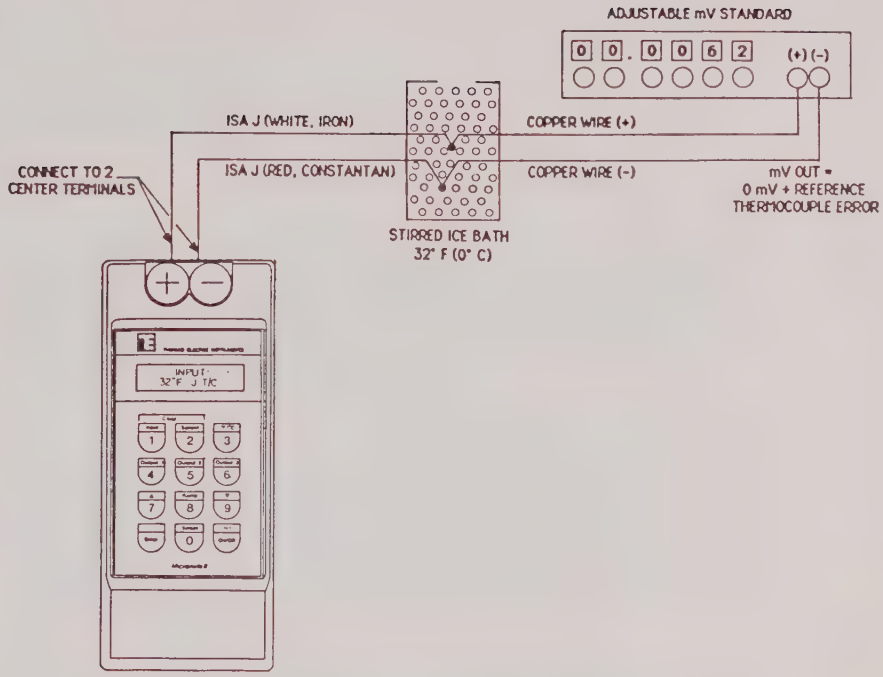
Equipment needed: reference thermocouple (ISA J), ice bath, adjustable mV standard

NOTE The RJC calibration should be done only if it is certain that the mV portion of the instrument is calibrated.

Enter the calibration mode, move the cursor to **RJC** and press "Enter". The display will indicate:

Input: **32°F J T/C**

Connect the calibration thermocouple and the adjustable mV standard as shown in Figure 2.5. Make sure the thermocouple is placed properly in the ice bath so that it is exposed to the maximum water flow. The thermocouple should be placed in the ice bath at least 15 minutes prior to calibration.



RJC CALIBRATION
Figure 2.5

NOTE Avoid touching the end of the thermocouple when connecting it to the instrument. Body heat can cause an erroneous calibration.

Allow at least 1-2 minutes for the thermocouple to stabilize after connecting it to the instrument. Use the adjustable mV source to take out the error in the reference thermocouple. Press "Enter". The Micromite II will display **WAIT!** while it is calibrating. This calibration can take as long as 30 seconds. When the calibration is complete, the instrument will display the calibration menu with the cursor pointing to **Exit**.

section 3 warranty

Thermo Electric Co. warrants each of its instruments to be free from defects in material and workmanship for a period of two years, commencing on the date of shipment from Thermo Electric Co.

The liability of the seller is limited to the repair and replacement of the product only if failure occurs during the warranty period and factory inspection shows no external effects or customer repair altered the functioning of the instrument.

The instrument is to be returned to Thermo Electric Co. or the nearest Thermo Electric Authorized Service Center, freight prepaid, via the most economical surface transportation method, after authorization by Thermo Electric Co. All charges for handling, reinstalling and miscellaneous expenses incurred will be the responsibility of the buyer.

When factory examination shows the returned instrument to be within the above warranty period, the equipment will be repaired or replaced, at the seller's option, at no charge to the buyer.

This warranty shall be rendered null and void when, in the judgement of qualified Thermo Electric Co. personnel, the equipment has been subjected to abnormal or abusive use or lack of proper care or maintenance by the buyer, or when it has been determined that environmental conditions have exceeded those specified by Thermo Electric Co.

Any alteration or repair of the instruments by the buyer or any party not authorized by Thermo Electric Co. without our specific consent, in writing, shall automatically terminate our warranty obligation.

This warranty on instruments manufactured and/or sold by Thermo Electric Co., or any service provided by us, is expressely in lieu of all other warranties expressed or implied. No warranty is made of merchantability or fitness for any particular purpose.

No agent is authorized to assume any liability for it or to make any written or oral warranties or obligations beyond those set forth herein, unless endorsed, in writing, and signed by an officer of Thermo Electric Co.

Note: Thermo Electric warrants the original and any subsequent factory calibration for a period of six months from date of shipment. This is providing the instrument has not be calibrated in the field, or required any other service.

section 4 instrument service

Thermo Electric has Instrument Service Centers throughout the United States and in Canada and Europe. For the location of the Instrument Service Center closest to you, call your Thermo Electric representative or your nearest Thermo Electric office:

United States and World Headquarters

Thermo Electric Co.
109 North 5th Street
Saddle Brook, NJ 07662
(201) 843-5800
FAX: (201) 843-7144

Eastern Region

Thermo Electric Co.
447 Market Street
Elmwood Park, NJ 07407
(201) 791-9683 or 791-9684

Southeastern Region

Thermo Electric Co.
3440 Oakcliff Road, Suite 128
Atlanta, GA 30340
(404) 451-3733
FAX: (404) 451-5822

Central Region

Thermo Electric Co.
5261 West 161st Street
Cleveland, OH 44142
(216) 433-4510 new 1-800-766-4020
FAX: (216) 433-1986

Walt Malloy
109 N. 5th ST
Saddle brook NJ
07663

Southwestern Region

Thermo Electric Co.
12503 Exchange Drive, Suite 540
Stafford, TX 77477
(713) 240-1330
FAX: (713) 240-4871

Western Region	Thermo Electric Co. 7061 Vineland Avenue North Hollywood, CA 91605 (818) 765-5276 or (213) 875-0861 FAX: (818) 765-2407
Canada	Thermo Electric (Canada) Ltd. 12 Rutherford Road South Brampton, Ontario Canada L6W 3J2 (416) 451-0813 FAX: (416) 451-4606
Europe	Thermo Electric International BV Veerpolder 40,2361 KW Warmond The Netherlands 01711-19206 FAX: 31171111653

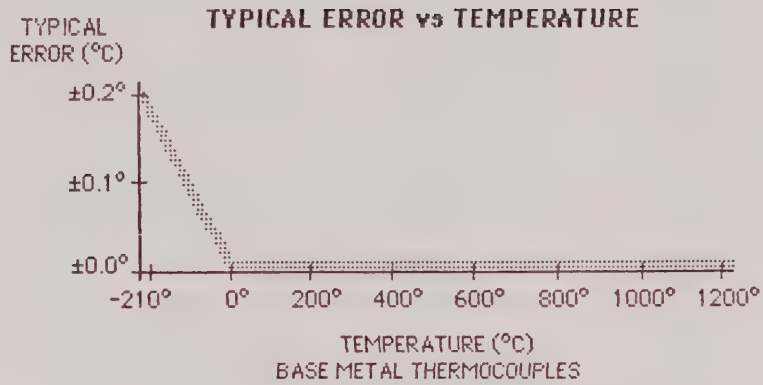
section 5 specifications

ambient operating temperature	0° to 55°C (32° to 131°F)
storage temperature (without batteries)	-20° to 70°C (-4° to 158°F)
warm up time (time required to meet full specifications)	15 minutes under normal ambient conditions
normal mode rejection	> 50 db @ 60 Hz
common mode rejection	> 125 db with AC adapter @ 230 VRMS, 60 Hz
temperature stability	15 ppm of reading/degree (max)
input/output resolution	
thermocouples	0.1°
millivolts	0.001 mV
RTD's	0.1°
ohms	0.01Ω
input impedance	100 MΩ
input leakage current	< 10 nA
input error due to source resistance	1μV/100Ω
output impedance	≤ 0.005 ohms; output into a fixed load
output drive capability	45Ω fixed load (min) @ 100 mV output (max) 35Ω fixed load (min) @ 80 mV output (max) 15Ω fixed load (min) @ 40 mV output (max) 10Ω fixed load (min) @ 25 mV output (max)
output settling time	
thermocouples	settles to within 0.5°F in < 3 seconds
millivolts	settles to within 0.008 millivolts in < 3 seconds
RTD's	settles to final value in < 30 seconds
ohms	settles to final value in < 30 seconds
thermocouple output compensation	fully compensated for changes in ambient temperature
maximum RTD output excitation current	2 mA
maximum RTD lead resistance	
4 wire	300Ω
3 wire	150Ω
RTD input excitation current	1 mA
RJC error @ 25°C	± 0.1°F (max)
RJC compensation error	
J, K, T, E, N, Platinel II	0.02 deg/deg* (max)
R, S, B, W5/W26	0.05 deg/deg* (max)

$$* \text{ deg/deg} = \frac{\text{T deg error}}{\Delta T_{amb}\ \text{deg}}$$

power	6 disposable AA batteries or AC adapter, 115 or or 230 VAC, 50/60 Hz
power consumption (AC)	0.5 Watts (max)
battery life (alkaline batteries)	
continuous use	50 hours (min) @ 75°F
normal use	> 70 hours @ 75°F
shelf life	> 6 months @ 75°F
case material	polycarbonate (G.E. Lexan™, Grade 141)
cover material	polypropylene
membrane keypad matarial	polycarbonate
weight (with batteries)	28 ounces
external dimensions	
length	8.6"
width	3.75"
depth	2.38"
display	2 lines of 16 alphanumeric characters, 5 x 7 dot matrix LCD
display update rate	2 updates/second
calibration uncertainty (Thermo Electric's instruments' traceability to NBS)	
thermocouples:	
J, K, T, E, N, Platinel II	± 0.25°F (max)
R, S, B, W5/W26	± 1.2°F (max)
millivolts	± 0.0035 mV (max)
RTD's	± 0.1°F (max)
ohms	± 0.015 Ω (max)
long term calibration stability	
thermocouples:	
J, K, T, E, N, Platinel II	± 0.1°F/month (max)
R, S, B, W5/W26	± 0.3°F/month (max)
millivolts	± 0.001 mV/month (max)
RTD's	± 0.1°F/month (max)
ohms	± 0.01 Ω/month (max)
recommended calibration interval (period over which instrument will meet stated accuracy)	6 months

RANGE AND ACCURACY TABLE



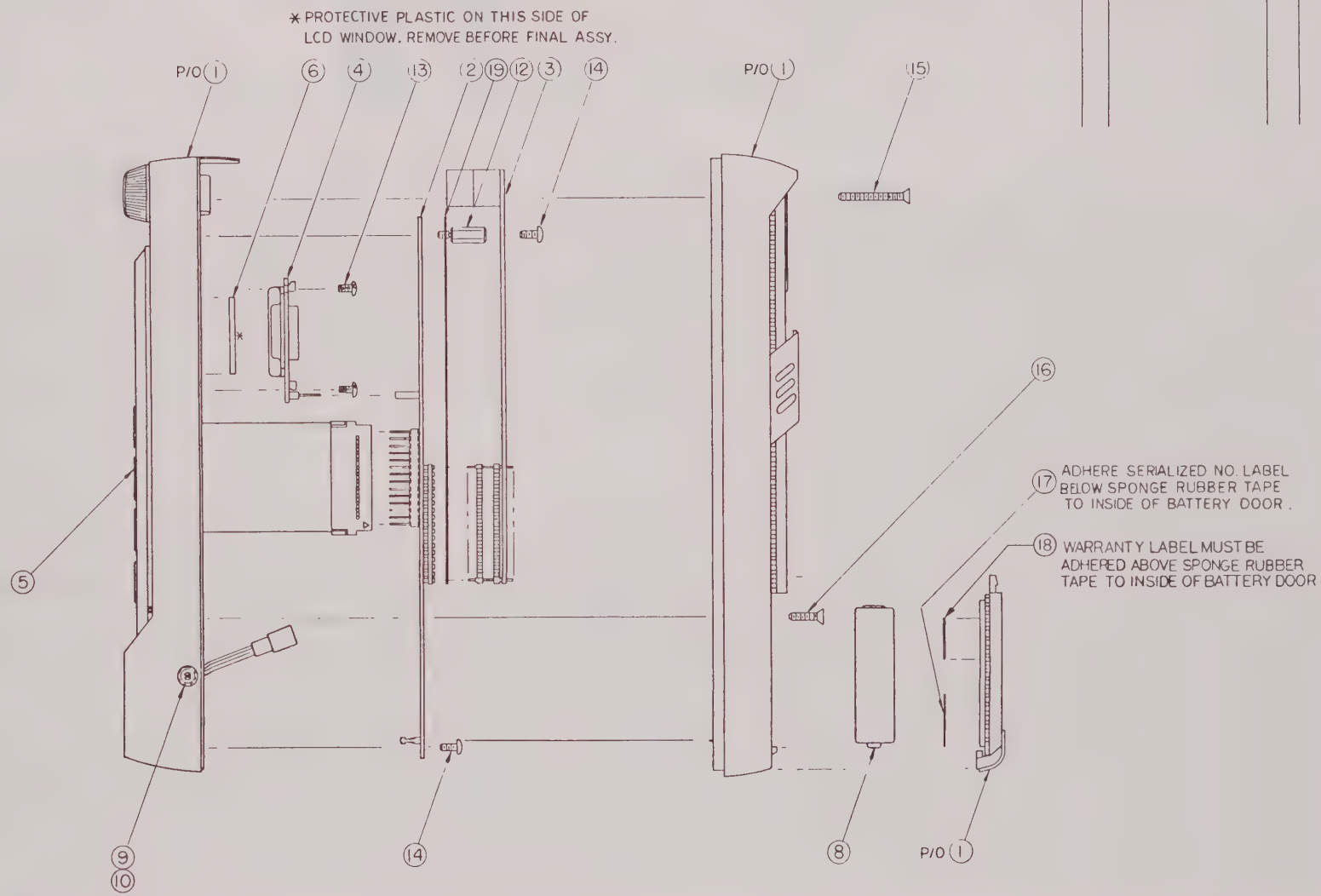
ISA Calibration	Available Range	Resolution	Accuracy Range(s)	Typical Error @32°F (0°C)	Typical Error @90% of span	Worst Case Error[1]
J[2]	-346.0 to 2192.0°F	0.1°F	-346.0 to 2192.0°F	±0.0°F	±0.1°F	±0.5°F
	-210.0 to 1200.0°C	0.1°C	-210.0 to 1200.0°C	±0.0°C	±0.0°C	±0.3°C
K[2]	-382.0 to 2500.0°F	0.1°F	-382.0 to -310.0°F	±0.5°F (@ -382.0°F)	N.A.	±1.0°F
			-310.0 to 2500.0°F	±0.0°F	±0.1°F	±0.5°F
	-194.4 to 1371.1°C	0.1°C	-194.4 to -190.0°C	±0.3°C (@ -194.4°C)	N.A.	±0.6°C
			-190.0 to 1371.1°C	±0.0°C	±0.0°C	±0.3°C
T[2]	-340.0 to 752.0°F	0.1°F	-340.0 to 752.0°F	±0.0°F	±0.1°F	±0.5°F
	-206.7 to 400.0°C	0.1°C	-206.7 to 400.0°C	±0.0°C	±0.0°C	±0.3°C
E[2]	-320.0 to 1832.0°F	0.1°F	-320.0 to 1832.0°F	±0.0°F	±0.1°F	±0.5°F
	-195.6 to 1000°C	0.1°C	-195.6 to 1000.0°C	±0.0°C	±0.0°C	±0.3°C
N[3]	32.0 to 2372.0°F	0.1°F	32.0 to 2372.0°F	±0.0°F	±0.1°F	±0.5°F
	0.0 to 1300.0°C	0.1°C	0.0 to 1300.0°C	±0.0°C	±0.0°C	±0.3°C
W5/W26[4]	32.0 to 4200.0°F	0.1°F	32.0 to 4200.0°F	±0.2°F	±0.3°F	±0.7°F
	0.0 to 2315.6°C	0.1°C	0.0 to 2315.6°C	±0.1°C	±0.2°C	±0.4°C
Platinel II[5]	-140.0 to 2543.0°F	0.1°F	-140.0 to 2543.0°F	±0.0°F	±0.1°F	±0.5°F
	-95.5 to 1395.0°C	0.1°C	-95.5 to 1395.0°C	±0.0°C	±0.0°C	±0.3°C
R[2]	0.0 to 3200.0°F	0.1°F	0.0 to 32.0°F	±0.6°F	N.A.	±2.5°F
			32.0 to 3200.0°F	±0.6°F	±0.8°F	±1.7°F
	-17.8 to 1760.0°C	0.1°C	-17.8 to 0.0°C	±0.4°C	N.A.	±1.4°C
			0.0° to 1760.0°C	±0.4°C	±0.5°C	±0.9°C

(continued)

ISA Calibration	Available Range	Resolution	Accuracy Range(s)	Typical Error @32°F (0°C)	Typical Error @90% of span	Worst Case Error[1]
S[2]	0.0 to 3200.0°F	0.1°F	0.0 to 32.0°F	±0.6°F	N.A.	±2.5°F
			32.0 to 3200.0°F	±0.6°F	±0.8°F	±1.7°F
	-17.8 to 1760.0°C	0.1°C	-17.8 to 0.0°C	±0.4°C	N.A.	±1.4°C
			0.0° to 1760.0°C	±0.4°C	±0.5°C	±0.9°C
B[2]	1000.0 to 3300.0°F	0.1°F	1000.0 to 3300.0°F	N.A.	±0.8°F	±1.7°F
	537.8 to 1815.6°C	0.1°C	537.8 to 1815.6°C	N.A.	±0.5°C	±0.9°C
RTD in[6]	-320.0 to 1500.0°F	0.1°F	-320.0 to 1500.0°F	±0.0°F	±0.1°F	±0.5°F
	-195.5 to 815.6°C	0.1°C	-195.5 to 815.6°C	±0.0°C	±0.0°C	±0.3°C
RTD out[6,7]	-320.0 to 1500.0°F	0.1°F	-320.0 to 1500.0°F	±0.1°F	±0.1°F	±0.7°F
	-195.5 to 815.6°C	0.1°C	-195.5 to 815.6°C	±0.0°C	±0.1°C	±0.4°C
			(typical error @ I_{ex} = 1.0 mA)			
Ohms in	0.00 to 700.00Ω	0.01Ω	0.00 to 700.00Ω	±0.00Ω (@ 0.00Ω)	±0.01Ω	±0.05Ω
Ohms out[7]	0.00 to 400.00Ω	0.01Ω	0.00 to 400.00Ω	±0.01Ω (@ 0.00Ω)	±0.02Ω	±0.14Ω
			(typical error @ I_{ex} = 1.0 mA)			
mV	-9.999 to 99.999 mV	0.001 mV	-9.999 to 99.999 mV	±0.001 mV (@ 0.000 mV)	±0.001 mV	±0.005 mV

1 At 75°F ±5°F within 6 months after calibration
2 Conformity based on IPTS-68; NBS Monograph 125
3 Conformity based on NBS Monograph 161 (AWG 14)
4 Conformity based on Hoskins Manufacturing Co., W5/W26 T/C
5 Conformity based on Engelhard Platinel II T/C
6 100 Ohm @ 0°C platinum RTD having an Alpha of 0.00385 with its conformity based on the DIN 4376 standard
7 With an excitation current between 0.1 mA and 2.0 mA

LET	REVISION	DATE	CK R	ENGR
	SEE ML FOR LATEST REV. CHANGES			



RED WIRE TO A+ PIN ON ITEM 2
WHT " " B+ " " " "
BLK " " B− " " " "

FOR COMPLETE LIST OF MATLS SEE MLE2213

Scale Tolerances (unless otherwise noted) Decimals x = ± .015 xx = ± .010 xxx = ± .005 Fractional ± 1/64 Break corners and edges .010 max All dimensions in inches unless otherwise specified	Dwg Made & Approved By	Draftsman	Checker	Engineer	MM II STOCK UNIT ASSY
	Initial	[illegible]		CK	
	Date	11/12/86		3/6/87	ASSY E2213 — Rev B

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

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MATERIAL LIST

TITLE
MICROMITE II
STOCK UNIT ASSEMBLY

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 2/19/87
DWN. FSK
CKR.
ENG. CJ
APPR.

ML3115700000

ML E2213
C DWG. NO.

SHEET 1 OF 2

ASS'Y DASH NO. & QUANTITY

	DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
*	1	CASE ASSEMBLY		E2062		C	1
*	2	DIGITAL P/C BD ASSEMBLY		E1828		C	1
*	3	ANALOG P/C BD ASSEMBLY		E1786		C	1
*	4	LCD & DISPLAY P/C BD ASSEMBLY		E2188		A	1
	5	MEMBRANE SWITCH		E1804		C	1
	6	LCD WINDOW		E2072		A	1
	7						
	8	BATTERY, AA ALKALINE		E2189		A	6
*	9	BATTERY ELIMINATOR JACK ASSEMBLY		E2064		A	1
	10	FLATWASHER, BATTERY ELIMINATOR JACK		E2183		A	1
	11						
	12	STANDOFF, #4-40 x 1/2" LG MALE-FEMALE HEX		E2180		A	2
	13	SCREW, #4 "F" TYPE x 3/16" LG SELF-TAPPING		A7308		A	4
	14	SCREW, #4-40 x 1/4" LG BINDING HD		E1152-1		A	4

REVISION

A ECN 30117 ITEM 17 WAS DWG # E1078 & ADDED ITEM 19 E2232 & REMOVE IT # 7 & 11 CG 5/7/87

B ECN 30169 CHKG. POS. OF IT #18 ON ASSY. CG 7/1/87

TE-262A

M E2213

MATERIAL LIST

TITLE
MICROMITE II
STOCK UNIT ASSEMBLY

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 2/19/87
DWN. RK
CKR.
ENG. CK
APPR.

ML3115700000

ML E2213 C DWG. NO.

SHEET 2 OF 2

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
15	SCREW, #4-40 x 1" LG FLAT HD		A8793-3		A	2
16	SCREW, #4-40 x 1/2" LG FLAT HD		A8793-6		A	2
17	SERIAL NO. LABEL	E1078	E2234		A	1
18	WARRANTY CODE LABEL		E2004		A	1
19	INSULATOR		E2232		A	1

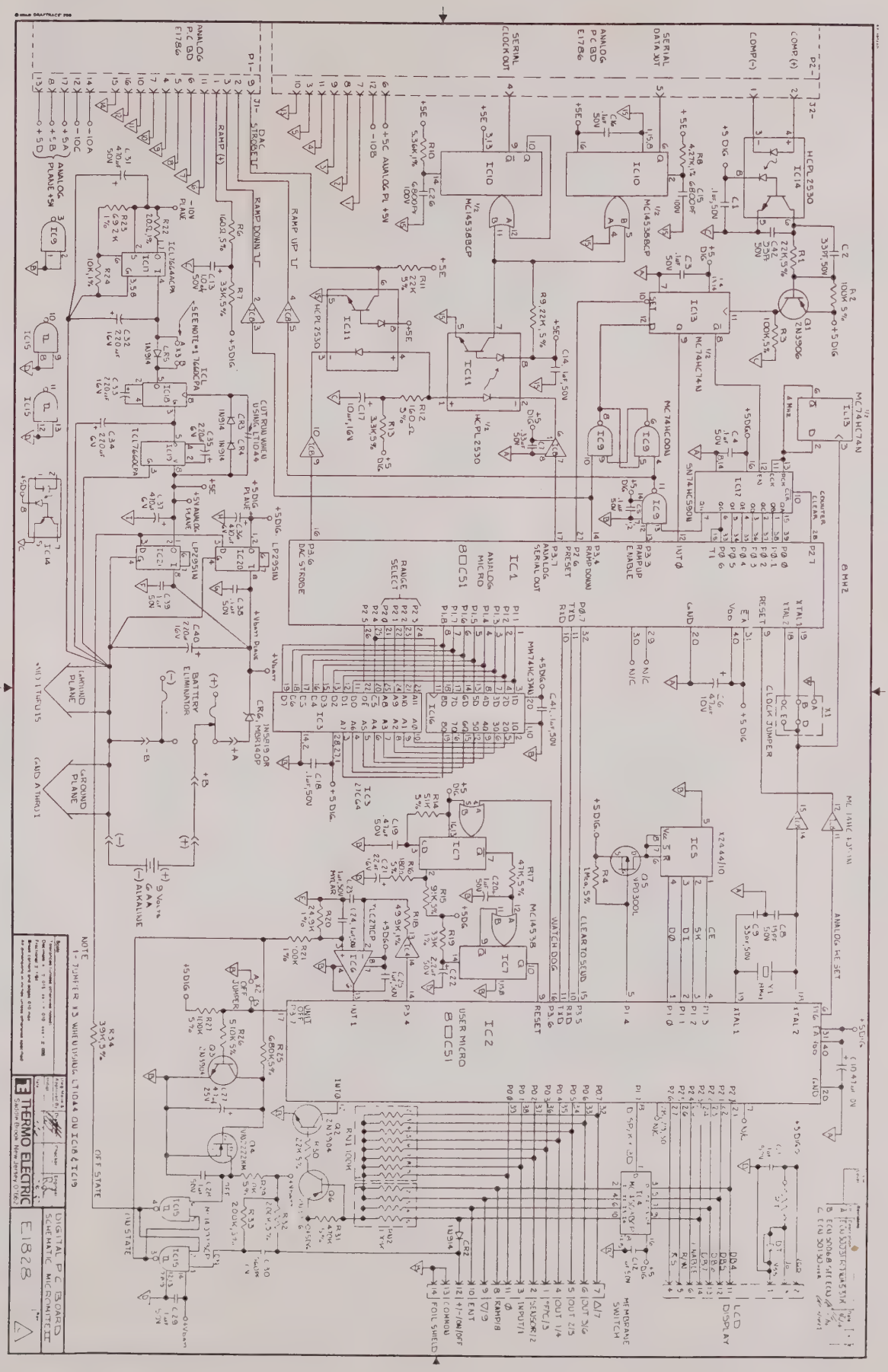
REVISION

TE-262A

N E2213

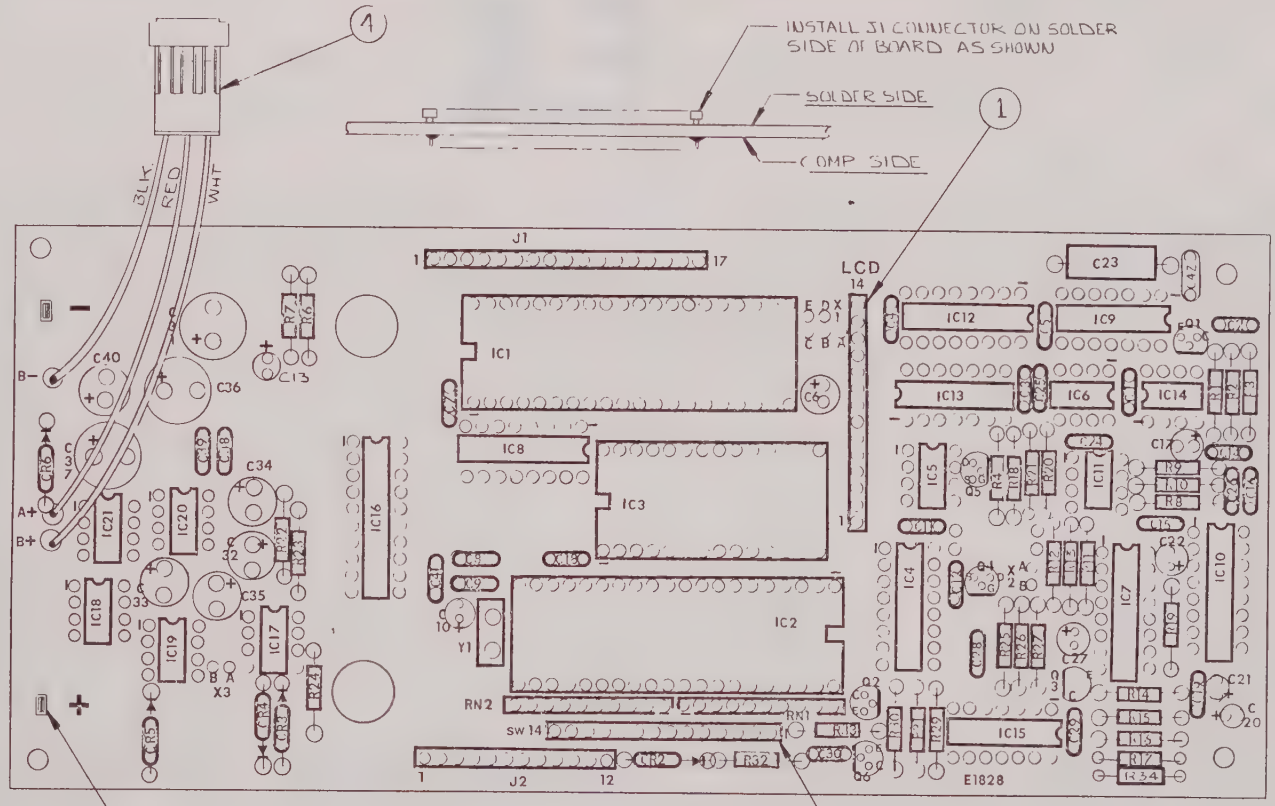
section 6 schematics & parts lists

Following are the complete schematic drawings and parts lists for the Micromite II, as of August 1, 1987.



DIGITAL P.C. BOARD
SCHEMATIC MICROMITE II
E1828
THERMO ELECTRIC
IC1 ANALOG 8051 MICRO
IC2 USER 8051 MICRO
NOTE
1- JUMPER X3 WHEN USING LT1044 ON IC16 & IC19

LET	REVISION	DATE	CK R	INSP
	SEE M.L FOR LATEST REV LEVEL			



ASSEMBLY DWG.

FOR COMPLETE LIST OF MAT'LS SEE ML E1828

Scale	Dwg Made & Approved By	Checker	Engineer
Tolerances (unless otherwise noted)	Initial		
Decimals .x ± .015 .xx ± .010 .xxx ± .005	Date		
Fractional ± 1/64			
Break corners and edges .010 max			
All dimensions in inches unless otherwise specified			

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DIGITAL P.C. BD.
MICROMITE II

E1828 — Rev D

MATERIAL LIST

TITLE
DIGITAL P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/11/86
DWN. EE
CKR.
ENG. RL
APPR.

ML311570UUUO

ML E1828
C DWG. NO.

SHEET 1 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
PCB	DIGITAL P.C. BOARD		E1829		C	1
C1	CAPACITOR - .1uf, 50V, CERAMIC		A8274-9		B	16
C3						
C4						
C5						
C11						
C12						
C14						
C16						
C18						
C24						
C25						
C28						
C29						
C38						
C39						
C41						
C2	CAPACITOR - 33PF, 50V, CERAMIC		A8274-10		B	3
C9						
C42						
C6	CAPACITOR - 47uf, 10V, ELECT.		A9280-4		A	2
C10						
C7	CAPACITOR - .33uf, 50V, CERAMIC		A8274-1		B	1

REVISION

A	ECN #30031 XIC5 WAS P/N A9681-1 AND R7 WAS 37K & XIC15 WAS XIC7 EE 12/10/86
B	ECN 30068 SEE ECN EE 2/24/86
C	ECN 30106 SEE ECN EE 5/13/87
D	ECN 30130 IC3 WAS P/N E1842-3, R29 WAS P/N A5717-58 EE 6/24/87

TE-262A

MATERIAL LIST

TITLE
DIGITAL P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/1/86
DWN. GB
CKR.
ENG. RJ
APPR.

ML E1828
DWG. NO.

SHEET 2 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
C8	CAPACITOR - 15 PF, 50V, CERAMIC		A8274-15		B	1
C15 C26	CAPACITOR - 6800PF, 2%, 100V, NPO		E2215-1		A	2
C17	CAPACITOR - 10 uf, 16V, ELECT.		E2152		A	1
C19	CAPACITOR - .47 uf, 50V, CERAMIC		A8274-2		B	1
C13 C20	CAPACITOR - 1 uf, 50V, ELECT.		E2097-1		A	2
C21	CAPACITOR - 22 uf, 16V, ELECT.		A9285		A	1
C22	CAPACITOR - 2.2 uf, 50V, ELECT.		E1968		A	1
C23	CAPACITOR - .1 uf, 50V, MYLAR		A8957		A	1
C27	CAPACITOR - 4.7 uf, 25V, ELECT.		A9280-1		A	1
C30	CAPACITOR - 560 PF, 50V, CERAMIC		A8710-2		B	1
C31	CAPACITOR - 470 uf, 50V, ELECT.		E1678		B	1
C32 C33 C40	CAPACITOR - 220 uf, 16V, ELECT.		E2153		A	3

REVISION

TE-262A

-30-

MATERIAL LIST

TITLE
DIGITAL P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/1/86
DWN. GG
CKR.
ENG. RJ
APPR.

ML E1828
C DWG. NO.
SHEET 3 OF 8
ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
C34	CAPACITOR - 220 uf, 6.3V, ELECT.		A9280-3		A	2
C35						
C36	CAPACITOR - 470 uf, 6.3V, ELECT.		A9280-2		A	2
C37						
CR2	DIODE - 1N914		A6789		A	4
CR3						
CR4						
CR5						
CR6	DIODE, SCHOTKY - MBR140P		E2035		A	1
Y1	CRYSTAL - 8 MHZ		E2162		A	1
Q1	TRANSISTOR - 2N3906		A8591		A	2
Q6						
Q2	TRANSISTOR - 2N3904		A8590		A	2
Q3						
Q4	TRANSISTOR - VN2222KM		E2163		A	1
Q5	TRANSISTOR - VP0300L		E2151		A	1

REVISION

TE-262A

MATERIAL LIST

TITLE
DIGITAL P.C. BD.
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 1/11/86
DWN. [illegible]
CKR.
ENG. RJ
APPR.

ML E1828 C DWG. NO.

SHEET 4 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
IC1	INTEGRATED CIRCUIT - 87C51	E2138-0	E2138-1		A	1
IC2	INTEGRATED CIRCUIT - 87C51	E2138-0	E2138-2		A	1
IC3	INTEGRATED CIRCUIT - 27C64	E1482-0	E1482-3		A	1
IC4	INTEGRATED CIRCUIT - MC14503BCP		A9893		A	1
IC5	INTEGRATED CIRCUIT - X2444/10		E2154		A	1
IC6	INTEGRATED CIRCUIT - TLC271CP		E1850		A	1
IC7	INTEGRATED CIRCUIT - MC14538BCP		E1953		A	1
IC8	INTEGRATED CIRCUIT - MC74HC4050N		E2155		A	1
IC9	INTEGRATED CIRCUIT - MC74HC00N		E1266		A	1
IC10	INTEGRATED CIRCUIT - MC14538BCP		E1953		A	1
IC12	INTEGRATED CIRCUIT - SN74HC590N		E2157		A	1
IC13	INTEGRATED CIRCUIT - MC74HC74N		E2144		A	1
IC11	INTEGRATED CIRCUIT - HCPL2530		A9920		A	2
IC14						

REVISION

TE-262A

MATERIAL LIST

TITLE
DIGITAL P.C. BD.
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/11/86
DWN. [illegible]
CKR.
ENG. RL
APPR.

ML E1828
C DWG. NO.
SHEET 5 OF 8
ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
IC15	INTEGRATED CIRCUIT-MC14093BCP		E2158		A	1
IC16	INTEGRATED CIRCUIT-MM74HC374N		E2026		A	1
IC17	INTEGRATED CIRCUIT-ICL7664ACPA		E2159		A	1
IC18	INTEGRATED CIRCUIT-ICL7660CPA		E2160		A	2
IC19						
IC20	INTEGRATED CIRCUIT-LP2951CN		E2161		A	2
IC21						
R1	RESISTOR- 22K, 5% CARB.		A5719-151		B	4
R9						
R11						
R30						
R2	RESISTOR- 100K, 5% CARB.		A5719-88		B	3
R3						
R27						
R25	RESISTOR- 680K, 5% CARB.		A5719-164		B	1
R4	RESISTOR- 1 MEG, 5%, CARB.		A5719-32		B	1
R6	RESISTOR- 160Ω, 5%, CARB.		A5719-127		B	2
R12						

REVISION

TE-262A

MATERIAL LIST

TITLE
DIGITAL P.C. BD.
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/11/86
DWN. CC
CKR.
ENG.
APPR.

ML E1828 C DWG. NO.

SHEET 6 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
R7	RESISTOR - 33K, 5%, CARB.		A5719-110		B	1
R8	RESISTOR - 4.27K, 1%, M.F.		A8688-373		B	1
R10	RESISTOR - 5.36K, 1%, M.F.		A8688-50		B	1
R13	RESISTOR - 3.3K, 5%, CARB.		A5719-123		B	1
R14	RESISTOR - 51K, 5%, CARB.		A5719-86		B	1
R15	RESISTOR - 91K, 5%, CARB.		A5719-162		B	1
R16	RESISTOR - 180Ω, 5%, CARB.		A5719-159		B	1
R17	RESISTOR - 47K, 5%, CARB.		A5719-92		B	1
R18	RESISTOR - 49.9K, 1%, M.F.		A8688-46		B	1
R19	RESISTOR - 33K, 5%, CARB.		A5719-110		B	1
R20	RESISTOR - 24.9K, 1%, M.F.		A8688-68		B	1
R21	RESISTOR - 100K, 1%, M.F.		A8688-26		B	1
R22	RESISTOR - 20Ω, 1%, M.F.		A8688-71		B	1
R23	RESISTOR - 69.2K, 1%, M.F.		A8688-404		B	1

REVISION

TE-262A

MATERIAL LIST

TITLE
DIGITAL P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/19/86
DWN. [illegible]
CKR.
ENG. R L
APPR.

ML E1828
DWG. NO.
SHEET 7 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
R24	RESISTOR - 10K, 1% M.F.		A8688-15		B	1
R26	RESISTOR - 510K, 5% CARBON		A5719-147		B	1
R29	RESISTOR - 10K, 5% CARBON		A5719-102		B	1
R31	RESISTOR - 470K, 5% CARBON		A5719-33		B	1
R32	RESISTOR - 200K, 5% CARBON		A5719-163		B	2
R33						
R34	RESISTOR - 39K, 5% CARBON		A5719-93		B	1
RN1	RESISTOR NETWORK - 100K, 10 PIN S.I.P.		A9233		A	2
RN2						
XIC1	SOCKET, 40 PIN DIP		A9241		A	2
XIC2						
XIC3	SOCKET, 28 PIN DIP		A8900		A	1
XIC5	SOCKET, 8 PIN DIP		A6724		A	1
J1	SOCKET STRIP, 17 POS		E2191-1		A	1
J2	SOCKET STRIP, 12 POS		E2191-2		A	1

REVISION

TE-262A

MATERIAL LIST

TITLE
DIGITAL P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/19/86
DWN. [illegible]
CKR.
ENG. RL
APPR.

ML E1828
C DWG. NO.
SHEET 8 OF 8
ASS'Y DASH NO. & QUANTITY

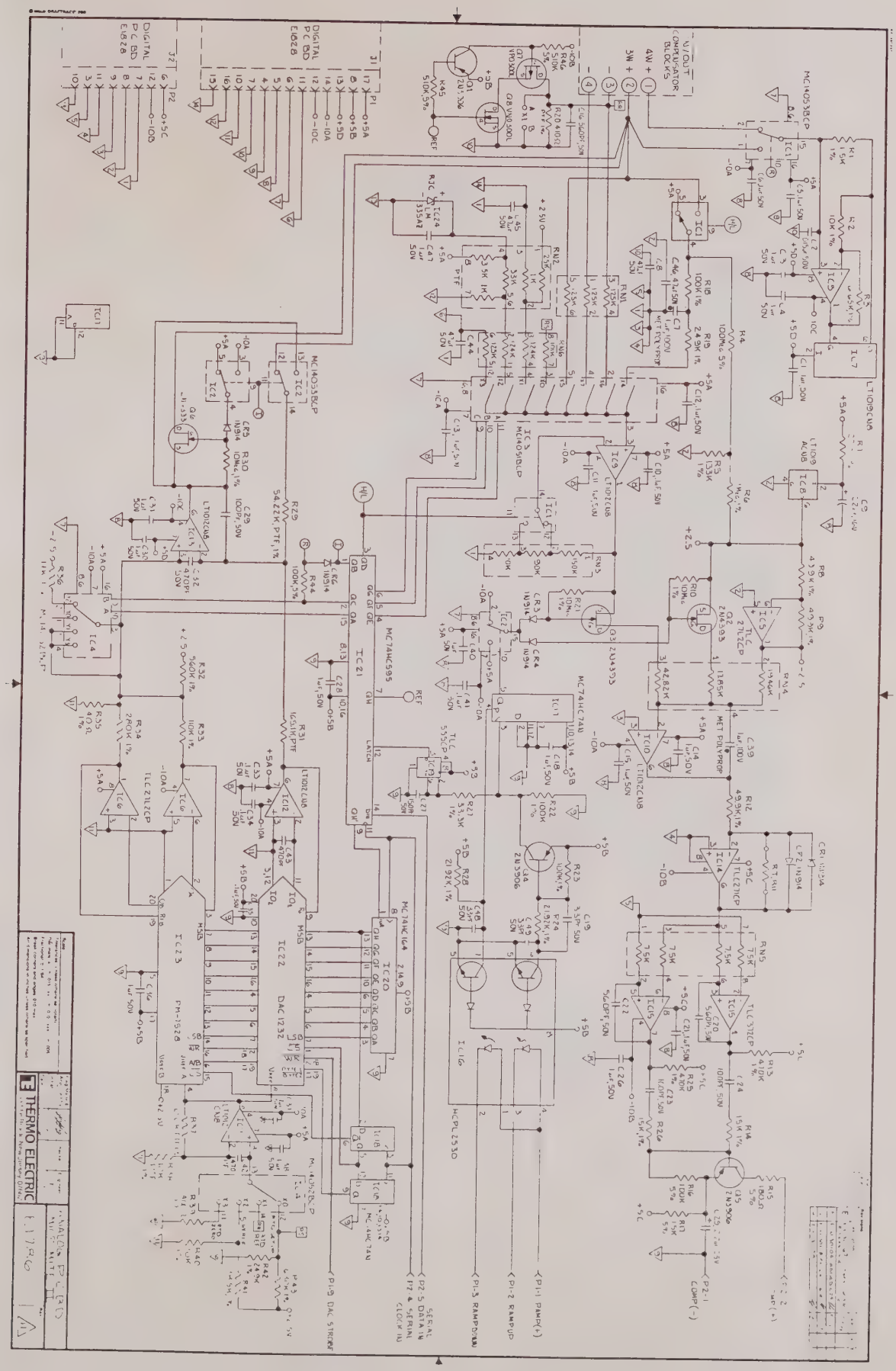
DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	X
1	SOCKET, 14 POS. IN-LINE (LCD)		E2182		A	1
2	HEADER, 14 POS IN-LINE (MEMBRANE SW)		A9529-6		A	1
3	RECEPTACLE, BD. MT. HIGH PRESS. (BATT. TO BD)		E2181		A	2
* 4	CONNECTOR, SOCKET ASSY		E2239		A	1
	SCHEMATIC DIAGRAM		ESD E1828		D	X

REVISION

TE-262A

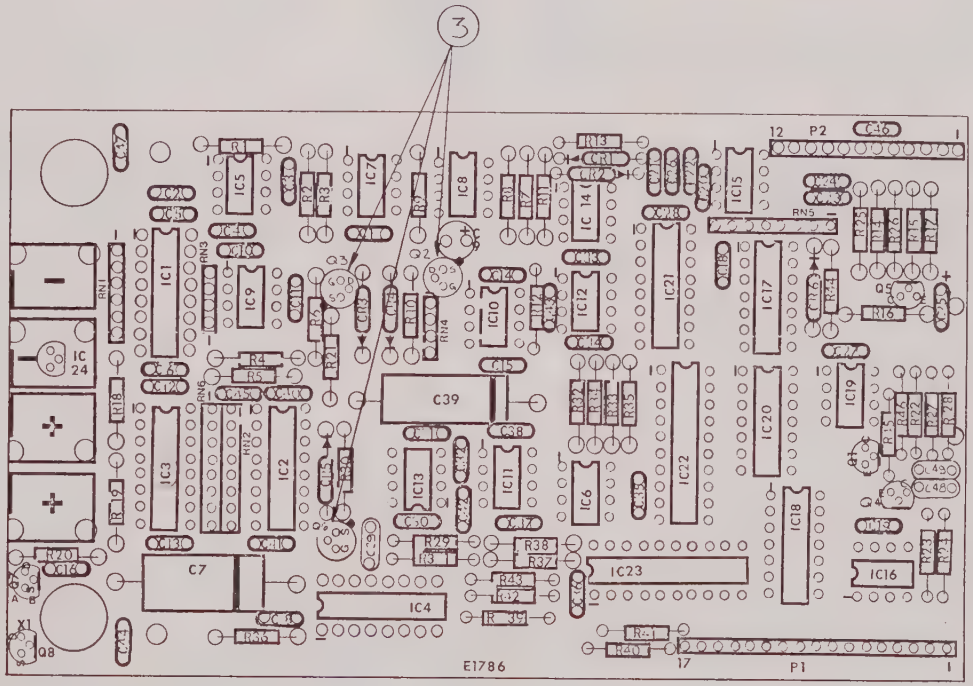
ML E1828

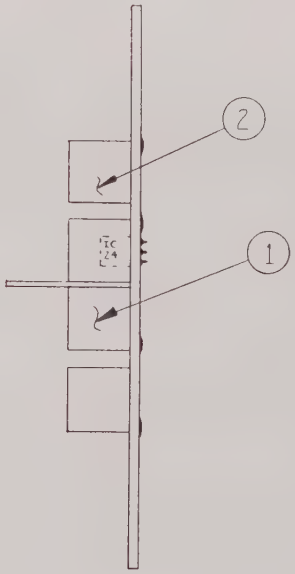
-36-



DIGITAL PC BD E1828
N/OUT COMPENSATOR BLOCKS
MC14053BCP
LT1019CN8
LT1019 ACN8
MC74HC595
MC74HC74N
MC74HC164
TLC27L2CP
TLC27L2CP
TLC27L2CP
TLC372CP
TLC27ICP
TLC2 2N3906
HCPL2530
IC21
IC22
IC23
IC20
DAC1232
PM-7528
MET POLYPROP
P1-9 DAC STROBE
P2-5 SERIAL DATA IN
P2-4 SERIAL CLOCK IN
P1-3 RAMPDOWN
P1-2 RAMPUP
P1-1 RAMP(+)
P2-1 COMP(-)
THERMO ELECTRIC

LET	REVISION	DATE	CK'R	ENG'R
	SEE M.L. FOR LATEST REVISION			





ASSEMBLY DWG.

FOR COMPLETE LIST OF MAT'LS. SEE M.L. E1786

Scale	Dwg Made & Approved By	Draftsman	Checker	Engineer
Tolerances (unless otherwise noted)	Initial			CC
Decimals .x ± .015 .xx ± .010 .xxx ± .005	Date			5/31/67
Fractional ± 1/64				
Break corners and edges .010 max				
All dimensions in inches unless otherwise specified				

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

ANALOG P.C. B.D.
MICROMITE II

E1786

Rev E

BREWER ASSOCIATES

MATERIAL LIST

TITLE
ANALOG P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/10/86
DWN. EC
CKR.
ENG. CV
APPR.

ML311570UUUU

ML E1786
C DWG. NO.

SHEET 1 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	
PCB	ANALOG P/C BOARD [illegible]	[illegible]	E1787		C	1
C1	CAPACITOR - .1MF, 50V CERAMIC		A8274-9		B	26
C3						
C4						
C5						
C6						
C10						
C11						
C12						
C13						
C14						
C15						
C18						
C21						
C26						
C28						
C30						
C31						
C33						
C34						
C35						
C36						
C37						
C38						
C40						
C41						
C47						

REVISION

A	ECN #30028 CHNGD. P/N R45 & R46 FROM A5719-160 TO A5719-147 [illegible] 11/5/86
B	ECN # 30054 ITEM 1 WAS P/N E2125, ITEM 2 WAS COMPENSATOR BLOCK P/N E1831-2
C	ECN #30067 C25 WAS P/N A8274-9 & R17 WAS P/N A5719-88 [illegible] 2/24/87
D	ECN #30104 ADDED C29 P/N A8710-7, C32 C42, C43 WERE A8710-3 [illegible]
E	ECN #30138 R34 WAS P/N A8688-401 ADDED IT #3 [illegible] 4/22/87

TE-262A

ML E1786

MATERIAL LIST

TITLE
ANALOG P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/14/86
DWN. 66
CKR.
ENG. CK
APPR.

ML E1786
C DWG. NO.
SHEET 2 OF 8

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE		ASS'Y DASH NO. & QUANTITY
C2	CAPACITOR - .015uf, 50V CERAMIC		A8274-6		B	1	
C7	CAPACITOR - 1uf, 100VdC, MET. POLY.		E2165		A	2	
C39							
C8	CAPACITOR - .47uf, 50V, CERAMIC		A8274-2		B	4	
C44							
C45							
C46							
C9	CAPACITOR - 22uf, 16V, ELECT.		A9285		A	1	
C16	CAPACITOR - 560PF, 50V, CERAMIC		A8710-2		B	3	
C20							
C22							
C19	CAPACITOR - 33PF, 50V, CERAMIC		A8274-10		B	3	
C48							
C49							
C23	CAPACITOR - 100PF, 50V, CERAMIC		A8410-1		B	3	
C24							
C29							
C37	CAPACITOR - 470PF, 50V, CERAMIC		A8274-4		B	3	
C42							
C43							

REVISION

TE-262A

ML 786

-04-

MATERIAL LIST

TITLE
ANALOG P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/10/86
DWN. CG
CKR.
ENG. CK
APPR.

ML E1786 C DWG. NO.

SHEET 3 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	
C27	CAPACITOR - 150PF, 50V, CERAMIC		A8710-1		B	1
C25	CAPACITOR - 2.2uf, 25V, TANTALUM		E1679		A	1
CR1	DIODE - 1N914		A6789		A	6
CR2						
CR3						
CR4						
CR5						
CR6						
IC1	INTEGRATED CIRCUIT - MC14053BCP		A9185		A	2
IC2						
IC3	INTEGRATED CIRCUIT - MC14051BCP		E2142		A	1
IC4	INTEGRATED CIRCUIT - MC14052BCP		E1851		A	1
IC5	INTEGRATED CIRCUIT - TLC27L2CP		E1852		A	2
IC6						
IC7	INTEGRATED CIRCUIT - LT1019CN8		E2143-1		A	1
IC8	INTEGRATED CIRCUIT - LT1019ACN8		E2143-2		A	1
IC14	INTEGRATED CIRCUIT - TLC271CP		E1850		A	1

REVISION

TE-262A

MATERIAL LIST

TITLE
ANALOG P.C. BD.
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 7-4-86
DWN. [illegible]
CKR.
ENG. CK
APPR.

ML E1786
C DWG. NO.
SHEET 4 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE		
IC9	INTEGRATED CIRCUIT-LT1012CN8		A9184		A	5	
IC10							
IC11							
IC12							
IC13							
IC15	INTEGRATED CIRCUIT-TLC372CP		E2036		A	1	
IC16	INTEGRATED CIRCUIT-HCPL2530		A9920		A	1	
IC17	INTEGRATED CIRCUIT-MC74HC74N		E2144		A	2	
IC18							
IC19	INTEGRATED CIRCUIT-TLC5556P		E2145		A	1	
IC20	INTEGRATED CIRCUIT-MC74HC164		E2146		A	1	
IC21	INTEGRATED CIRCUIT-MC74HC595		E2147		A	1	
IC22	INTEGRATED CIRCUIT- DAC1232		E1240		A	1	
IC23	INTEGRATED CIRCUIT- PM-7528		E2148		A	1	
IC24	INTEGRATED CIRCUIT- LM335AZ		E2149		A	1	
Q1	TRANSISTOR- 2N3906		A8591		A	3	
Q4							
Q5							

REVISION

TE-262A

ML E1786

MATERIAL LIST

TITLE
ANALOG P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/1/76
DWN. EE
CKR.
ENG. CK
APPR.

ML E1786
C DWG. NO.
SHEET 5 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE		
Q2	TRANSISTOR- 2N4393		E2150		A	3	
Q3							
Q6							
Q7	TRANSISTOR- VP0300L		E2151		A	1	
Q8	TRANSISTOR- VN0300L		E2164		A	1	
RN1	RESISTOR NETWORK-125K, 6PIN SIP		E2131		A	1	
RN2	RESISTOR NETWORK- 8PIN SIP		E2132		A	1	
RN3	RESISTOR NETWORK- 4 PIN SIP		E2133		A	1	
RN4	RESISTOR NETWORK- 4PIN SIP		E2134		A	1	
RN5	RESISTOR NETWORK - 7.5K, 8PIN SIP		E2135		A	1	
RN6	RESISTOR NETWORK- 8PIN SIP		E2136		A	1	
R1	RESISTOR- 1.5 K, 1% M.F.		A8688-43		B	1	
R2	RESISTOR- 10 K, 1% M.F.		A8688-15		B	2	
R40							
R3	RESISTOR- 6.65 K, 1% M.F.		A8688-266		B	1	
R4	RESISTOR- 100 Meg, 5% CARB.		A5719-134		B	1	

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TE-262A

ML E1786

MATERIAL LIST

TITLE
ANALOG P.C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/14/16
DWN. CC
CKR.
ENG. CK
APPR.

ML E1786
C DWG. NO.
SHEET 6 OF 8
ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	
R5	RESISTOR - 133K, 1%, M.F.		A8688-56		B	1
R6	RESISTOR - 1MEG., 1%, M.F.		A8688-201		B	1
R7	RESISTOR - 27.5Ω, 1%, M.F.		A8688-397		B	1
R8	RESISTOR - 49.9K, 1%, M.F.		A8688-46		B	3
R9						
R12						
R10	RESISTOR - 10M, 1%, M.F.		A8688-398		B	3
R21						
R30						
R13	RESISTOR - 470K, 1%, M.F.		A8688-399		B	2
R25						
R14	RESISTOR - 15K, 1%, M.F.		A8688-18		B	2
R26						
R15	RESISTOR - 180Ω, 5%, CARB.		A5719-159		B	1
R16	RESISTOR - 100K, 5%, CARB.		A5719-88		B	2
R44						
R17	RESISTOR - 15K, 5% CARB.		A5719-156		B	1

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ML E1786

MATERIAL LIST

TITLE
ANALOG P. C. BOARD
MICROMITE II

THERMO ELECTRIC
Saddle Brook, New Jersey 07662

DATE: 11/10/80
DWN. GC
CKR.
ENG. CK
APPR.

ML E1786 C DWG. NO.

SHEET 7 OF 8

ASS'Y DASH NO. & QUANTITY

DETAIL NO.	DESCRIPTION	MAT'L	DWG. NO.	REV.	DWG. SIZE	
R18	RESISTOR - 100K, 1%, M.F.		A8688-26		B	3
R22						
R23						
R19	RESISTOR - 24.9K, 1%, M.F.		A8688-68		B	2
R42						
R20	RESISTOR - 410Ω, 1%, PTF		E2141-1		A	1
R24	RESISTOR - 21.92K, 1% M.F.		A8688-239		B	2
R28						
R27	RESISTOR - 33.3K, 1% M.F.		A8688-67		B	1
R21	RESISTOR - 54.22K, 1% PTF		E2141-4		A	1
R31	RESISTOR - 165.1K, 1% PTF		E2141-5		A	1
R32	RESISTOR - 560K, 1%, M.F.		A8688-400		B	1
R33	RESISTOR - 110K, 1%, M.F.		A8688-55		B	1
R34	RESISTOR - 280K, 1%, M.F.		A8688-357		B	1
R35	RESISTOR - 40.2Ω, 1%, M.F.		A8688-402		B	1
R36	RESISTOR - 11K, 1%, M.F.		A8688-53		B	1

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MP MASTER
MA24274